

TERPS & Airspace Overview

Michael Vermuth,
Los Angeles
Flight Procedures Office

LAX FPO

OVERVIEW

In this session we will discuss:

- A general overview of TERPS
- TERPS surfaces that are under control of airport sponsors
- Recent changes to TERPS that impact airport approach minimums
- Questions on TERPS and instrument approach issues

What is TERPS?

- TERPS is the short name for FAA Order 8260.3, U.S. Standard for Terminal Instrument Procedures (including Changes 1 – 20)
- TERPS is also used by U.S. Army, Navy, Air Force and Coast Guard.
- Companion documents include FAA Order 8260.19, Flight Procedures and Airspace, and TERPS Instruction Letters (or TILs).

TERPS Overview

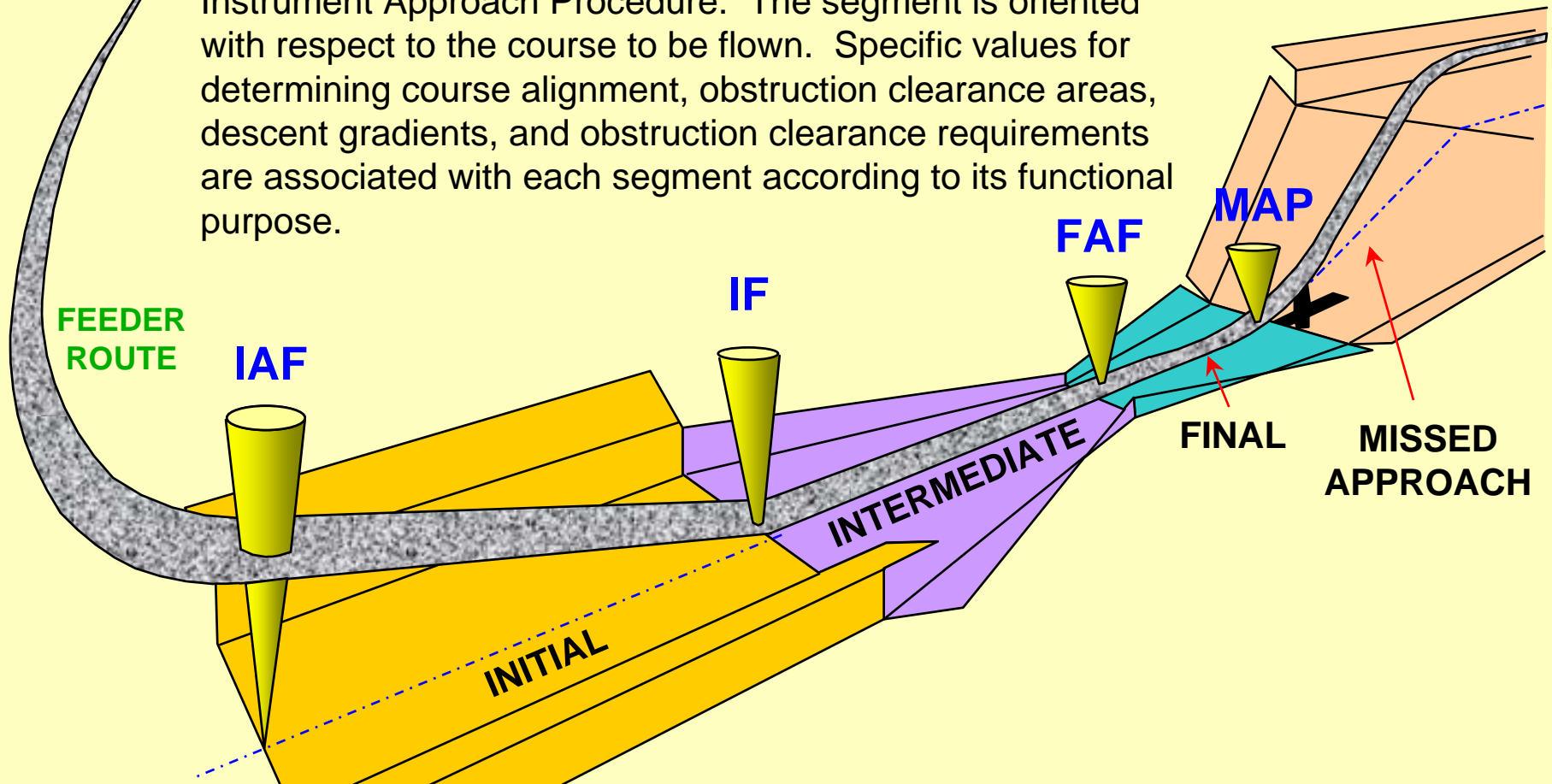
- TERPS is the FAA Order that describes the clearances, dimensions and procedures for developing instrument approach procedures.
- Using TERPS an FAA specialist can develop an instrument approach procedure that provides positive guidance to a pilot from cruise altitude to the runway, and if necessary, the missed approach procedure and back to a safe holding position.

TERPS Procedure Construction

- Four Possible Segments
 - Initial
 - Intermediate
 - Final
 - Missed approach
- Must also consider circling areas

PROCEDURE CONSTRUCTION

SEGMENTS - The basic functional division on an Instrument Approach Procedure. The segment is oriented with respect to the course to be flown. Specific values for determining course alignment, obstruction clearance areas, descent gradients, and obstruction clearance requirements are associated with each segment according to its functional purpose.

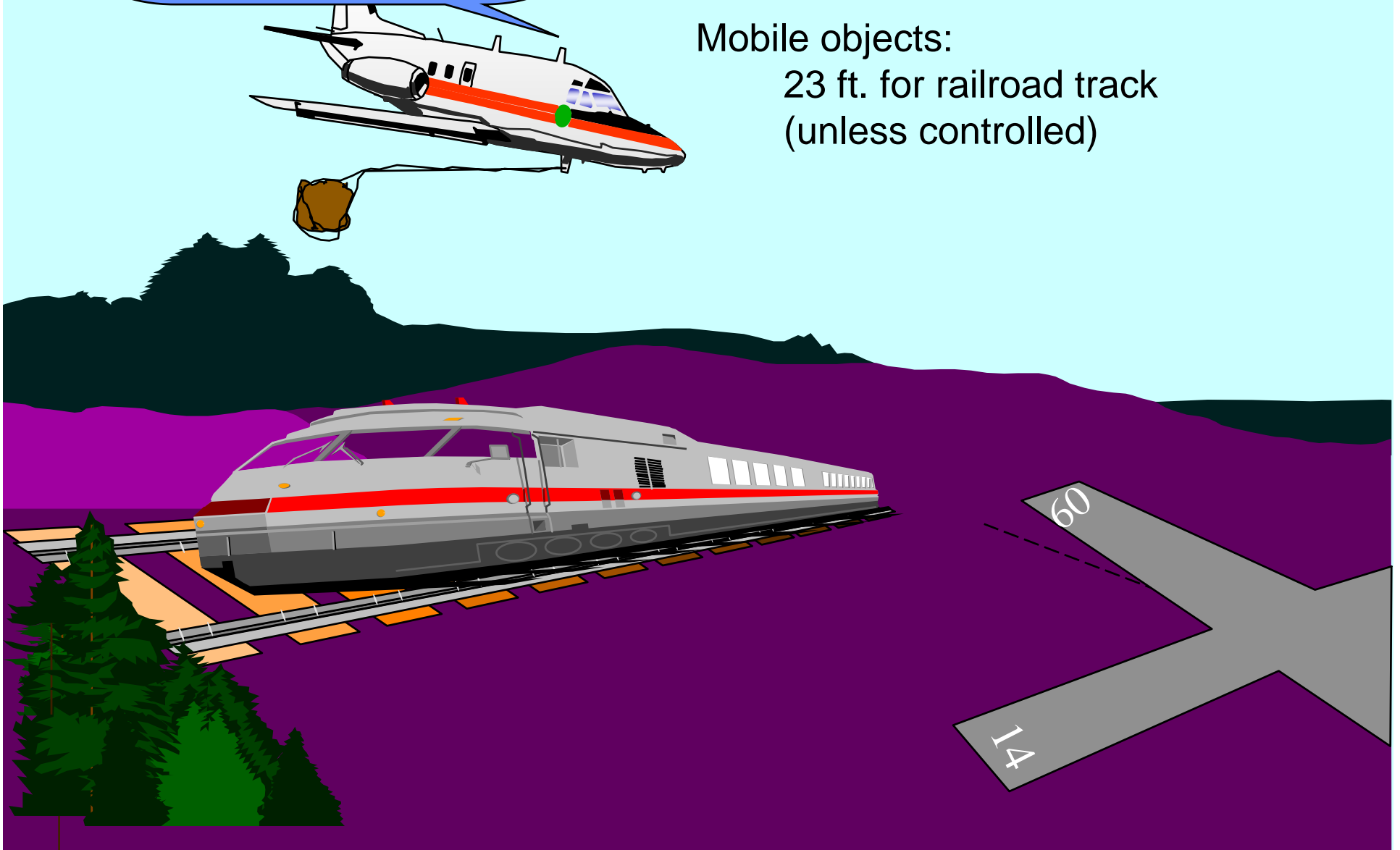


I STILL DON'T KNOW
WHY WE HAVE THAT
ROC

OBSTRUCTIONS

Mobile objects:

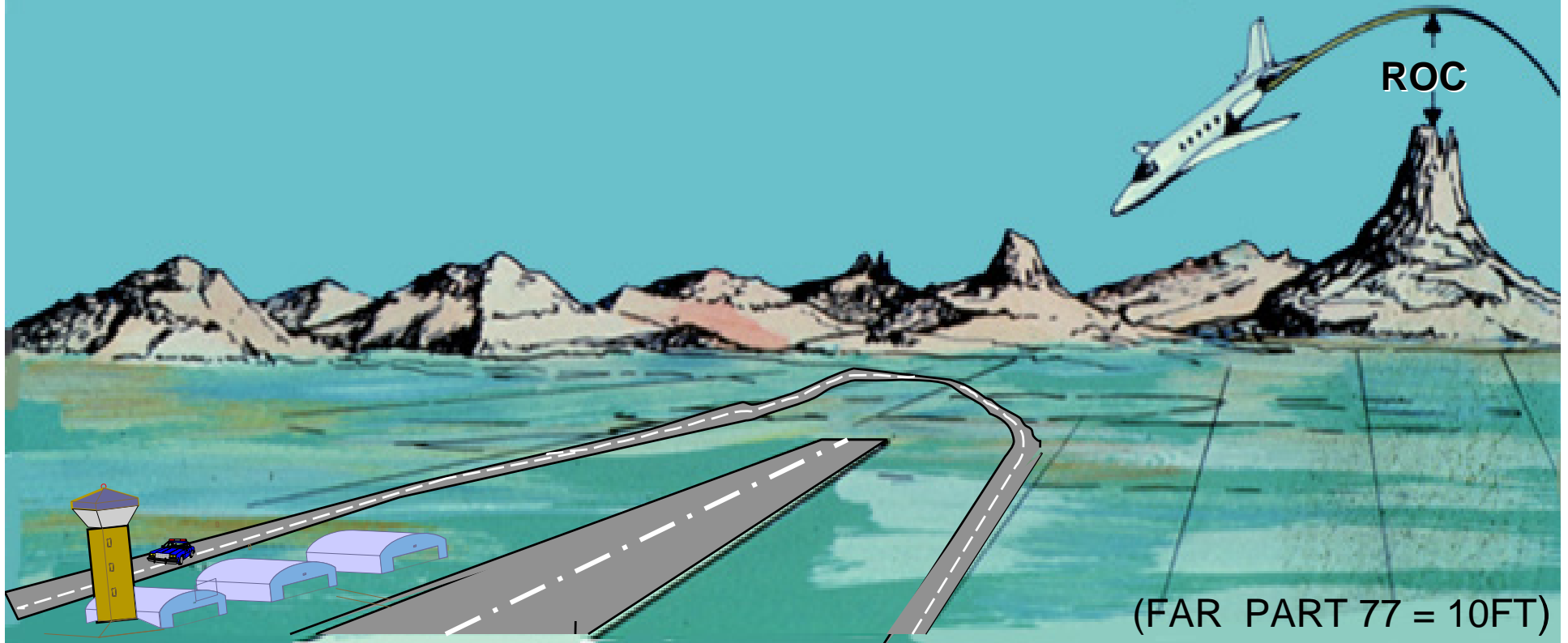
23 ft. for railroad track
(unless controlled)



GENERAL INFORMATION











OBSTRUCTIONS

Mobile objects: For on airport roads is 10 ft.



APPROACH CATEGORIES

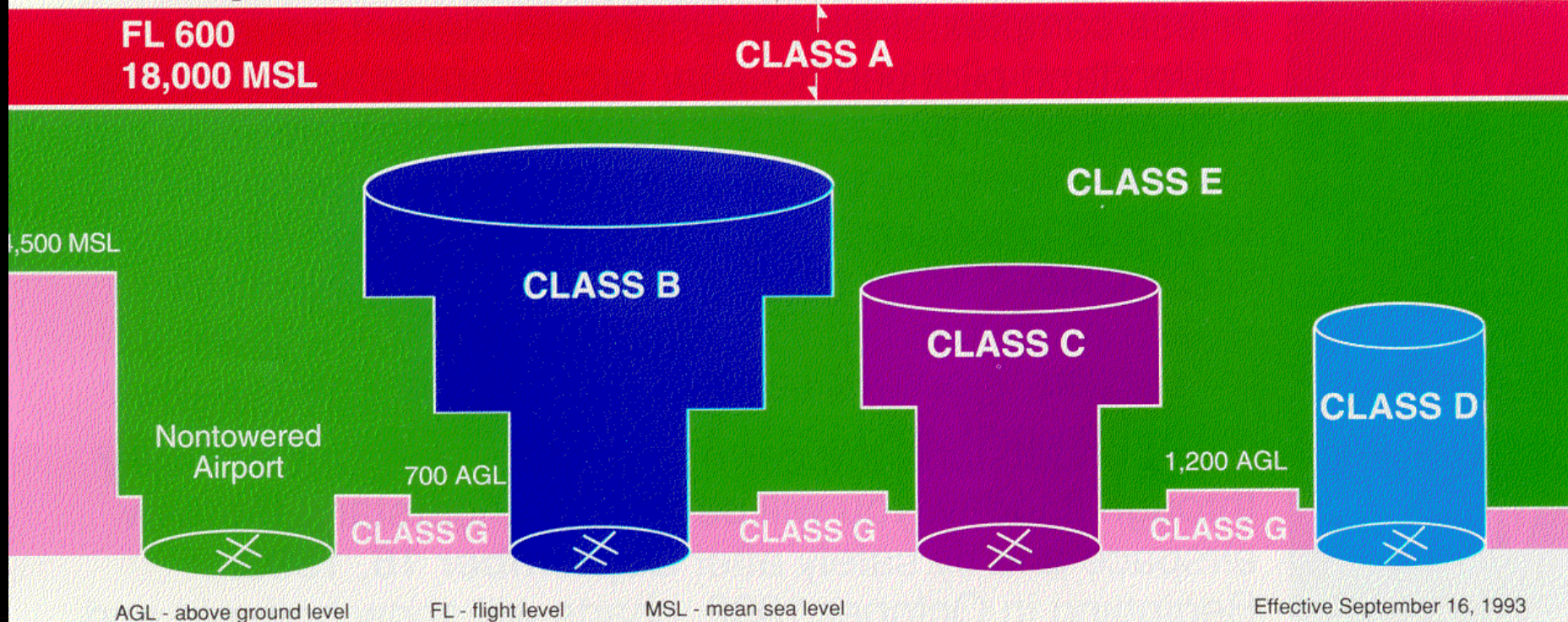
Category	Speed at minimum	Speed at Maximum
A		91 knots
B	92 knots	121 knots
C	122 knots	141 knots
D	142 knots	166 knots
E	166 knots	

Approach Category	Approach Speed	
A	Up to 90KTS	 
B	91 to 120KTS	 
C	121 to 140KTS	 
D	141 to 165KTS	 
E	Above 165KTS	 

APPROACH CATEGORIES

- Based on aircraft performance as assigned by the manufacturer and operational directives
- Defined in CFR part 97
- Used to determine turning radii and obstacle clearance areas for Circling and Missed Approach

Airspace Reclassification at a Glance



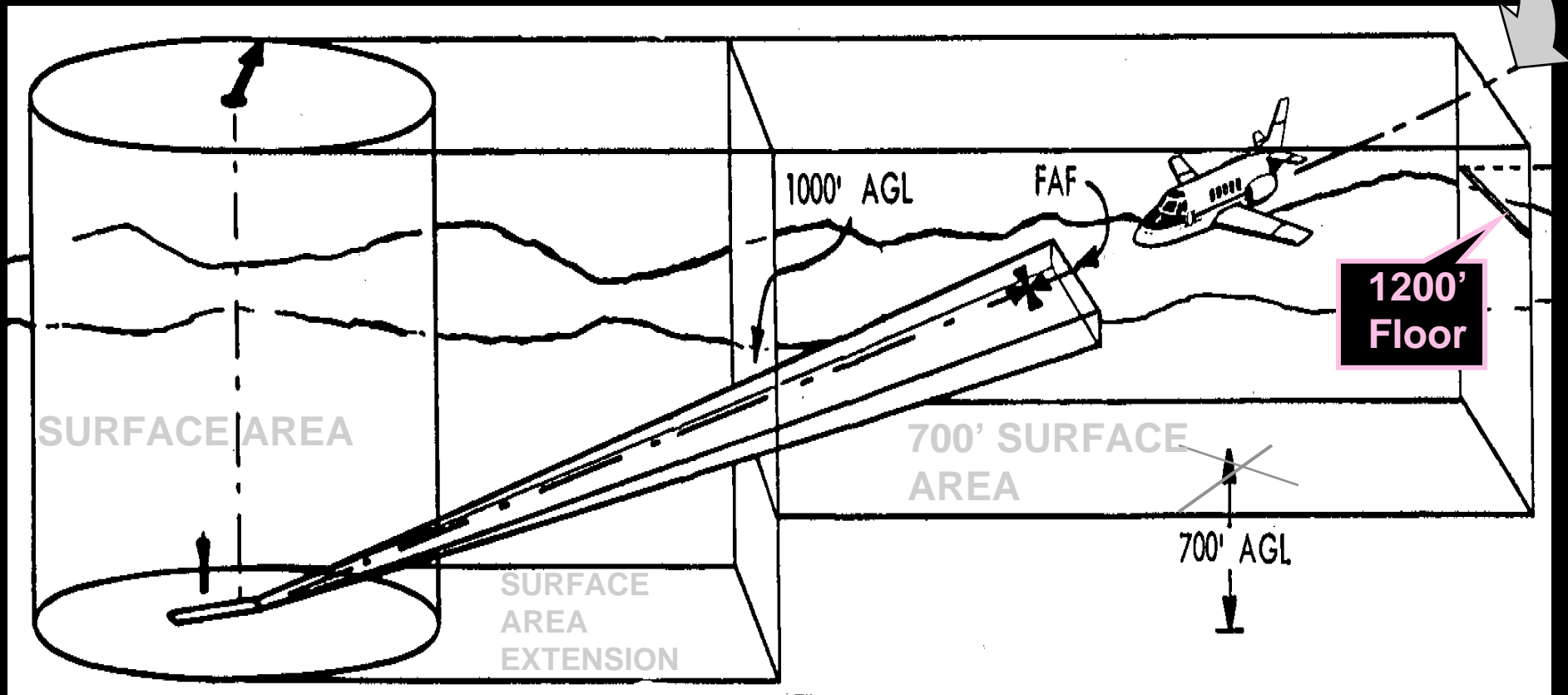
And an Easy-to-Read Chart

Airspace Features	Class A	Class B	Class C	Class D	Class E	Class G
Former Airspace Equivalent	Positive Control Area (PCA)	Terminal Control Area (TCA)	Airport Radar Service Area (ARSA)	Airport Traffic Area (ATA) and Control Zone (CZ)	General Controlled Airspace	Uncontrolled Airspace
Operations Permitted	IFR	IFR and VFR	IFR and VFR	IFR and VFR	IFR and VFR	IFR and VFR
Entry Requirements	ATC clearance	ATC clearance	ATC clearance for IFR. All require radio contact.	ATC clearance for IFR. All require radio contact.	ATC clearance for IFR. All IFR require radio contact.	None

TERMINAL AIRSPACE

8260.19 Chapter 5

1500 AGL

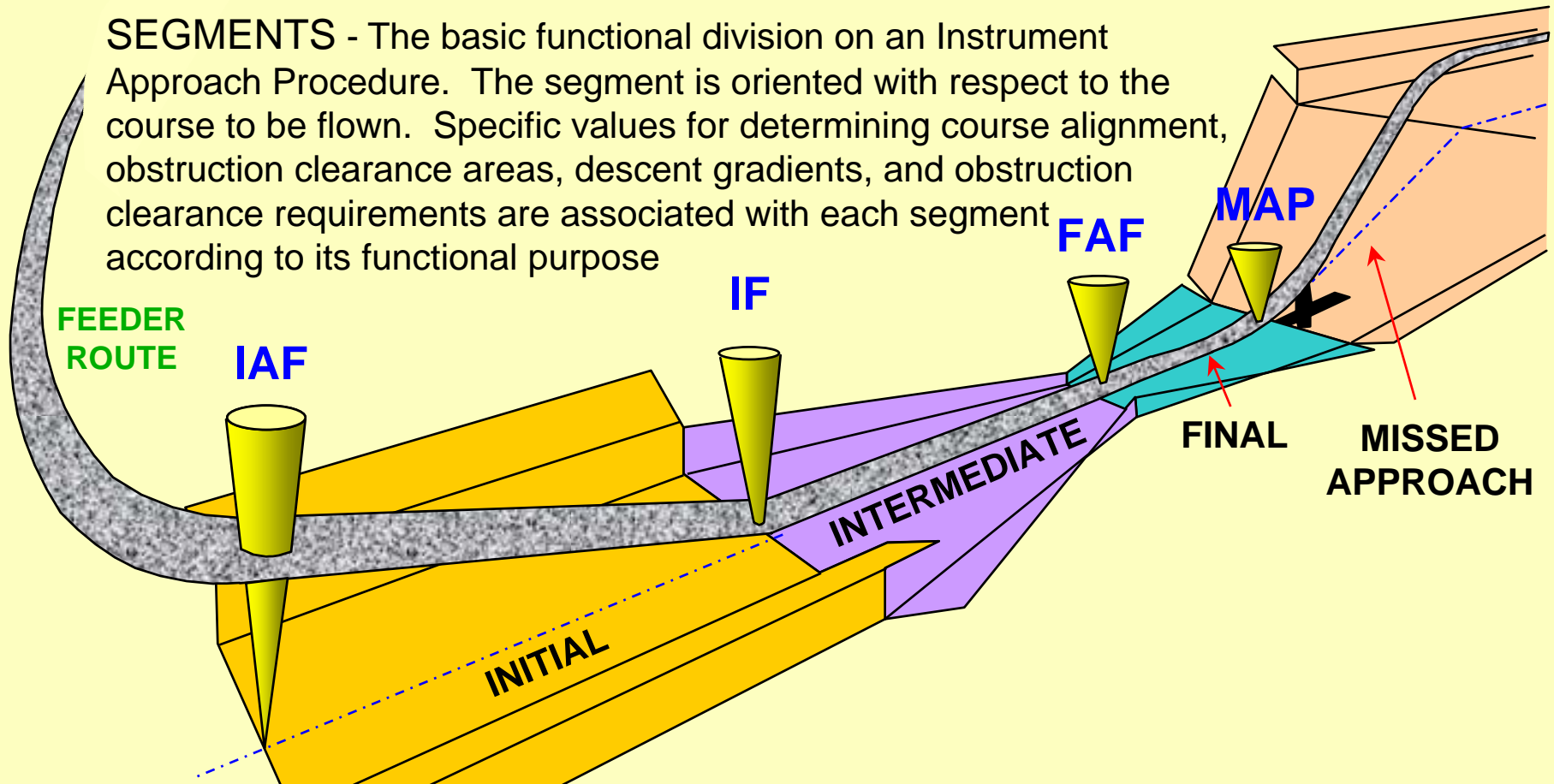


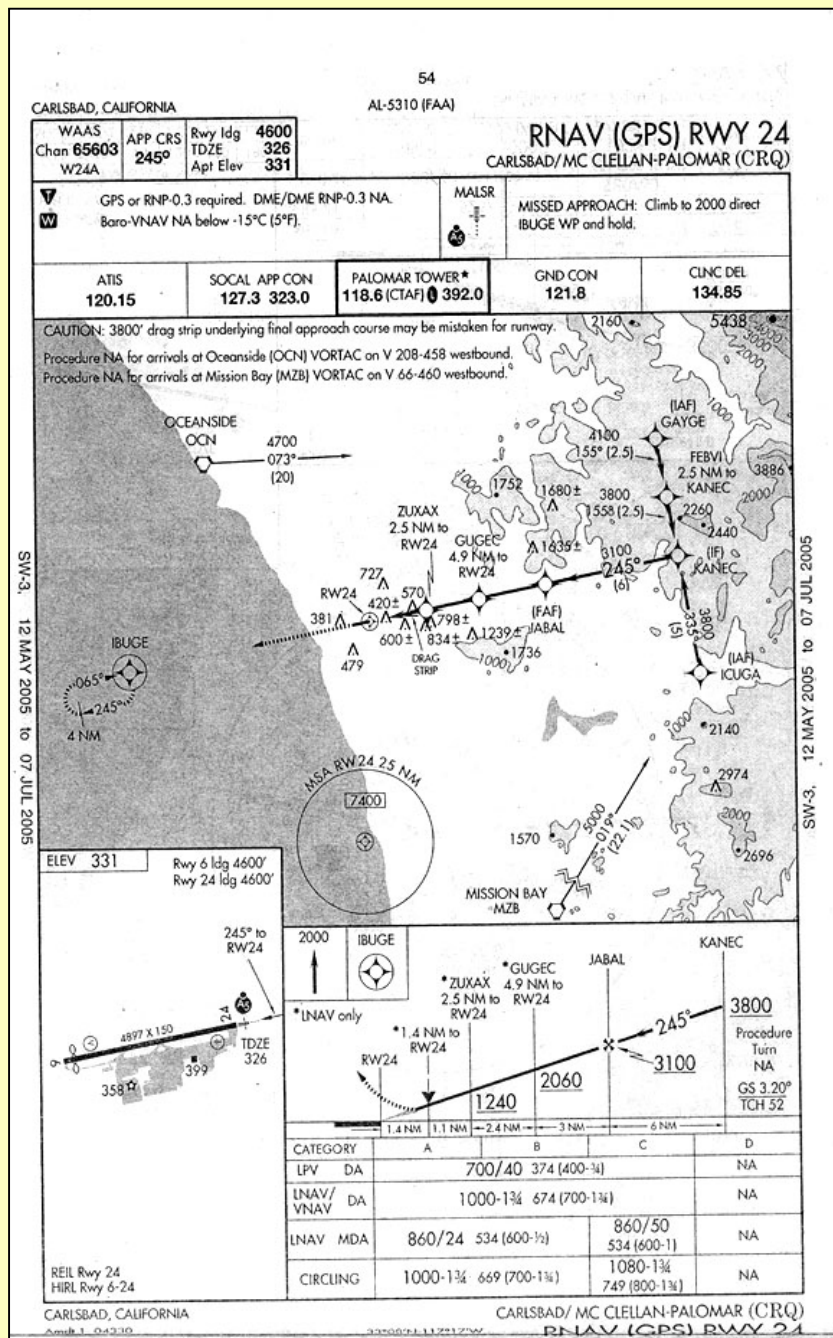
TERPS Overview

- TERPS surface calculation is really “just math”
- TERPS calculations depend on:
 - Type of aircraft (category)
 - Navigational aids available/employed
 - Application of TERPS clearance standards
 - Conditions of underlying terrain/obstacles (accurate survey of obstructions!)

PROCEDURE CONSTRUCTION

SEGMENTS - The basic functional division on an Instrument Approach Procedure. The segment is oriented with respect to the course to be flown. Specific values for determining course alignment, obstruction clearance areas, descent gradients, and obstruction clearance requirements are associated with each segment according to its functional purpose





The Instrument Approach Plate (Or Just "Plate" for Short)

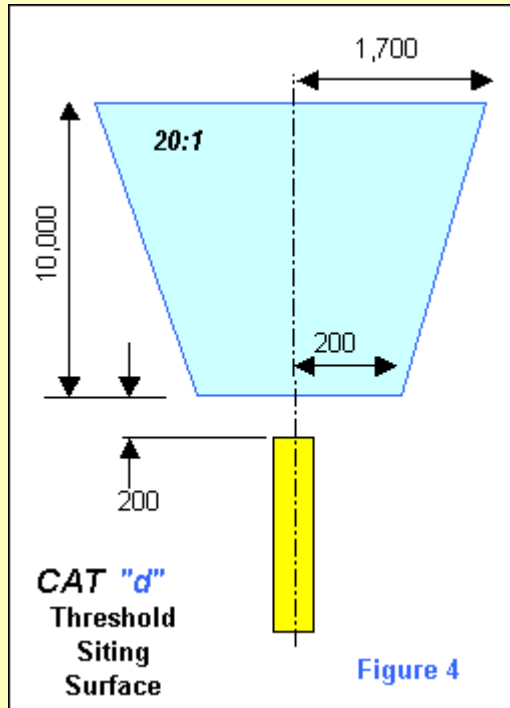
What can a Sponsor do?

- Sponsors usually can control and should be interested in the final approach segment
- The status of obstructions on the final approach segment up to the missed approach point is critical to best minimums!

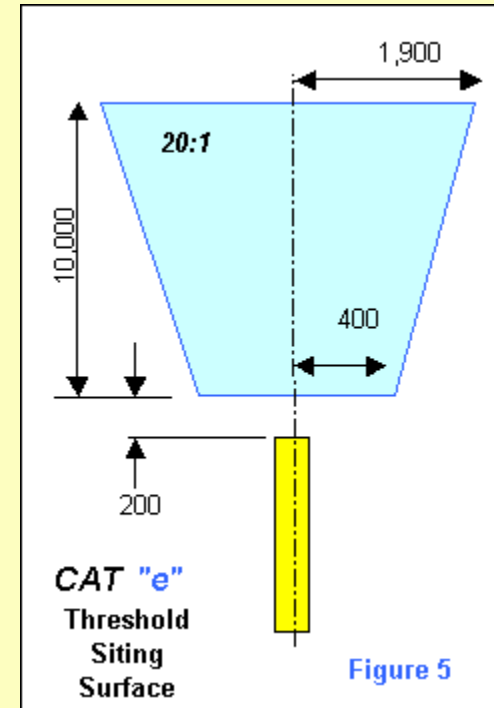
Recent Changes to TERPS

- Change to TERPS Paragraph 251
- Change also captured in A/C 150/5300-13, Appendix 2 (Threshold Siting)
- This change increased clearing requirement from 400 feet to 800 feet width
- Corresponding Part 77 approach surface width is only 500 feet wide

Threshold Siting Surfaces



d. For Approach End of Runways expected to Support Instrument Night Circling.

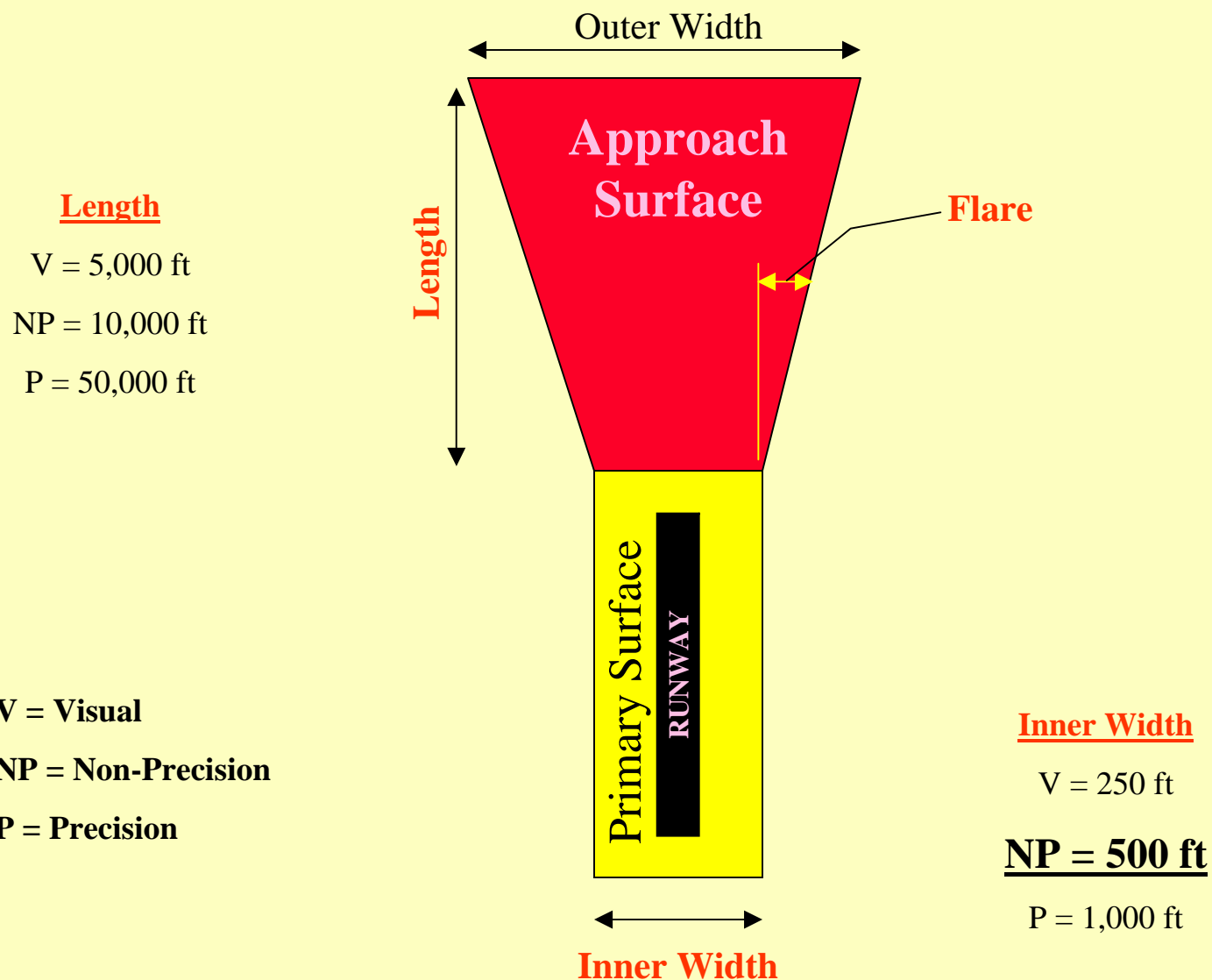


e. For Approach End of Runways Expected to Support Instrument Straight-In Night Operations.

(3) If the instrument approach procedure utilizes an offset localizer with an offset angle of 3 degrees or less, the above surface is centered upon the final approach course rather than the extended runway centerline. (See Figure A2-3 of the AC).

(4) To obtain night minimum, penetrations to this surface must be lighted to avoid displacing the threshold.

FAR Part 77 Surfaces



Recent Changes to TERPS

- Appendix 2. Threshold Siting Criteria so that the 800 foot wide threshold surface only applies to Category C/D/E aircraft approaches...
- Category A and B approach procedures will only require the 400 foot wide threshold surface.

Recent Changes to TERPS

- Timing:
- FAA will evaluate all new inst. approach procedures when developed
- FAA will evaluate all existing inst. approach procedures when amended or at next periodic review

Recent Changes to TERPS

- When obstructions penetrate the 20:1 TERPS/Threshold siting surface, FAA will notify the sponsor.
- Sponsor has 3 years to bring runway approach up to compliance
- If not in compliance in 3 years, FAA will cancel night minimums.

Appendix 2. THRESHOLD SITING

- **4. EVALUATION CONSIDERATIONS.**
- **a. When a penetration to a surface defined in paragraph 5 (threshold siting surfaces) exists, one or more of the following actions is required:**
 - The **object is removed or lowered** to preclude penetration of applicable threshold siting surfaces;
 - The **threshold is displaced** to preclude object penetration of applicable threshold siting surfaces, with a resulting shorter landing distance; or
 - Visibility **minimums are raised**.
 - **Prohibit night operations.**

Add?

(5) Establish Vertical Glide Slope Indicator (VGSI) to retain Night Minimums when it is impossible to light and mark penetrating obstacles. (TIL 03-047, Visual Segment 251 20:1 Surface Penetrations)

What should airports do to avoid cancellation of night minimums?

- Obtain accurate surveys of approaches
- Identify obstructions
- Update ALP and property maps to plan for clearing approaches
- Acquire necessary land interest to clear obstructions
- Ensure that all planning studies evaluate approaches

Questions?

- Publishing Category C/D approaches at airports that only meet A/B design standards?

References

- **FAA Advisory Circular 150/5300-13, Airport Design**
- **FAA Order 8260.3B, US Standard For Terminal Instrument Procedures (TERPS)**
 - VOLUME 1, General Criteria
 - VOLUME 2, Nonprecision Approach Procedure (NPA) Construction,
 - VOLUME 3, Precision Approach (PA) and Barometric Vertical Navigation (BaroVNAV) Approach Procedure Construction.
 - VOLUME 4, Departure Procedure Construction.
 - VOLUME 5, Helicopter and Powered Lift Instrument Procedure Construction,
 - **Cancellation.**
 - **FAA Order 8260.36A**, Civil Utilization of Microwave Landing System (MLS), dated January 19, 1996;
 - **FAA Order 8260.39A**, Close Parallel ILS/MLS Approaches, dated December 29, 1999;
 - **FAA Order 8260.4**, Obstacle Assessment Surface Evaluation for Independent Simultaneous Parallel Precision Operations, dated September 15, 1995;
 - **FAA Order 8260.47**, Barometric Vertical Navigation (VNAV) Instrument Procedures Development, dated May 26, 1998.
- **FAA Order 8260.19C, Flight Procedures and Airspace**

Sponsor Responsibilities

- **Airport Layout Plan**
 - Know where your airport is going!
 - Can you get there?
 - Accurate representation of your airport.
 - Update periodically & submit to FAA.
- **Land Use Management & Planning**
 - Review periodically.
 - Look beyond the Airport boundary!
 - See who is doing what around you!
 - Actively coordinate with your surrounding municipalities.
 - Actively look for potential impacts & mitigate now!

Sponsor Responsibilities

- **Airport Safety Data Record - 5010**
 - Actively participate in the yearly inspections.
 - Don't wait on someone else!
 - Make plans to eliminate adverse obstructions!
 - Review 5010 Data periodically.
 - Look for impacts and changes.
- **NPIAS / CIP / ACIP**
 - Actively Plan your mitigation needs.
 - Review your Capital & Implementation Program.
 - Update to reflect your **High Risk needs!**

Sponsor Responsibilities

- **Do your Homework!**
 - Select aviation consultants that understand the **Impacts** to **YOUR** Instrument Approach Procedures.
 - **Actively** work with them throughout the process!
 - **Ask** questions & **understand** them!
 - No one knows your airport better than **you**!
 - **No one else is ultimately responsible but you!**

What FAA Needs

- **Clear understanding on where you are heading!**
- **Accurate Data Submissions!**
 - Garbage in – Garbage out
 - Accurate data is an absolute **MUST!**
 - ALP
 - Airspace Applications & Processing
 - Surveys
 - IAW FAA Standard 405
 - 5010
 - Obstructions to Arrival and Departure Surfaces
 - Location, Height & Distance